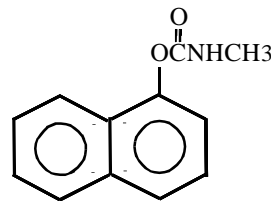


CARBARYL

Carbaryl is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 63-25-2

Molecular Formula: $C_{12}H_{11}NO_2$



Carbaryl is an odorless, colorless solid crystal. It is moderately soluble in N,N-dimethylformamide (DMF), acetone, isophorone, cyclohexanone, and polar organic solvents (Merck, 1983).

Physical Properties of Carbaryl

Synonyms: 1-naphthalenol methylcarbamate; methyl carbamic acid 1-naphthyl ester; 1-naphthyl; n-methylcarbamate; ENT 23969; OMS 29; UC 7744; Arylam; Carylderm; Dicarbam; Ravyon; Seffein; Sevin

Molecular Weight:	201.22
Boiling Point:	decomposes on distillation
Melting Point:	142 °C
Density/Specific Gravity:	1.23 at 20/20 °C (water = 1)
Vapor Pressure:	1.36×10^{-6} mm Hg at 25 °C
Water Solubility:	120 mg/l at 30 °C
Log Octanol/Water Partition Coefficient:	2.36
Conversion Factor:	1 ppm = 8.23 mg/m ³

(Howard, 1990; HSDB, 1991; Merck, 1983; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Carbaryl is registered as an insecticide, and is applied agriculturally for the control of insects in orchards, vineyards, and on vegetable, rice, cotton, and tomato fields. It is also registered for myriad other uses in and around homes; for the control of garden, turf, and household insects, spiders, centipedes and other miscellaneous arthropods. It is registered for the control of fleas and ticks and is available as dust spray or collars for cats and dogs. It is also registered for use as a bait for a variety of garden pests (DPR, 1996).

The licensing and regulation of pesticides for sale and use in California are the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of carbaryl has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

B. Emissions

No emissions of carbaryl from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of carbaryl was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of carbaryl.

INDOOR SOURCES AND CONCENTRATIONS

According to the Nonoccupational Pesticide Exposure Study, conducted by the United States Environmental Protection Agency (U.S. EPA), published in January 1990, levels of 32 pesticides were measured in 24-hour samples obtained inside and outside homes located in two cities. Approximately 70 homes in Jacksonville, Florida were monitored for three seasons, and approximately 50 homes in Springfield/Chicopee, Massachusetts were monitored for two seasons. Mean indoor concentrations of carbaryl ranged from below detection limits to 0.3 nanograms per cubic meter in Springfield/Chicopee. For both cities, average indoor carbaryl concentrations were higher than corresponding outdoor concentrations (Immerman and Schaum, 1990).

ATMOSPHERIC PERSISTENCE

Carbaryl will distribute between the gas and particle phases in the atmosphere. In the particle phase, carbaryl will be subject to wet and dry deposition. The average half-life and lifetime for particles and particle-associated chemicals in the troposphere is estimated to be about 3.5 to 10 days and 5 to 15 days, respectively (Balkanski et al., 1993; Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

Carbaryl emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to carbaryl are inhalation, ingestion, and dermal contact (HSDB, 1991).

Non-Cancer: Carbaryl is a carbamate-type acetyl-cholinesterase inhibitor. This inhibition allows acetylcholine to accumulate, thereby leading to over-stimulation of innervated organs (Sittig, 1991).

The U.S. EPA has established an oral Reference Dose (RfD) of 0.1 milligrams per kilogram per day for carbaryl based on kidney and liver toxicity in rats. The U.S. EPA estimates that consumption of this dose or less, over a lifetime, would not result in the occurrence of chronic, non-cancer effects. The U.S. EPA has not established a Reference Concentration (RfC) (U.S. EPA, 1994a).

No information is available on adverse reproductive or developmental effects in humans. Adverse reproductive effects, including birth defects, reduced fertility, litter size, and increased mortality in offspring have been reported with test animals exposed to carbaryl in the diet (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of carbaryl in humans. The U.S. EPA has classified carbaryl in Group D: Not classifiable as to human carcinogenicity (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified carbaryl in Group 3: Not classifiable as a carcinogen (IARC, 1987a).

